WE CLAIM:

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1. A method for endoluminally isolating a pathological defect in the vicinity of a branched passageway, comprising the steps of:

advancing through each branch of the branched passageway a graftstent complex, each of the graftstent complexes comprising a first stent and a graft;

aligning the first stents relative to each other in a common passageway on one side of the pathological defect, the common passageway being in direct fluid communication with the branched passageway, each graft extending into a respective branch of the branched passageways across the pathological defect; and

deploying each of the aligned first stents in the common passageway, whereby fluid flows in the passageway through each of the graftstent complexes thereby isolating the pathological defect.

2. A method as in claim 1, wherein the first stents include alignment surfaces that engage when expanded and wherein the step of aligning the first stents includes the step of rotationally orienting the first stents so that the alignment surfaces face each other.

3. A method as in claim 1, wherein the first stents are simultaneously deployed in a generally "D" shaped configuration, each of the "D" shaped deployed stents including a curved surface and an alignment surface.

4. A method as in claim 1, wherein the curved surface is adapted to engage the body lumen and the alignment surface is adapted to engage the aligned stent.

5. A method as in claim 1, wherein the step of deploying includes the step of hemostatically sealing the aligned first stents against each other and walls of the common passageway.

6. A method as in claim 1, wherein each of the grafts of the graftstent complexes is attached at one end to a respective one of the first stents, each of the graftstent complexes further including a second stent attached at another end of the graft.

7. A method as in claim 6, including the further step of deploying the second stents within each of the branched passageways on an other side of the pathological defect.

8. A method as in claim 7, wherein second stents are of the self-expanding type, and the step of deploying each of the second stents includes the step of withdrawing each of a pair of sheaths to a position free of each of the second stents thereby permitting the second stents to self-expand within each of the branched passageways on the other side of the pathological defect.

9. A method as in claim 1, wherein the pathological defect is one of an aneurysm and an occlusion.

10. A method as in claim 1, wherein the branched passageway is a branched blood vessel, the common passageway is a common vessel, and the fluid is a blood.

11. A method for endoluminally excluding an aortic aneurysm in a patient's vascular system, comprising the steps of:

advancing through each branch of a patient's femoral and iliac arterial system a graftstent complex, each of the graftstent complexes comprising a first stent and a graft;

aligning the first stents relative to each other in a common region of normal aortic tissue on one side of the aneurysm; and

deploying each of the aligned first stents in the common region, whereby blood in a patient's vascular system flows through each of the graftstent complexes and thereby excludes the aneurysm.

12. A method as in claim 11, wherein the aligned first stents are simultaneously deployed.

13. A method as in claim 11, wherein the aortic aneurysm extends into one of the patient's iliac and femoral arterial system

14. A method as in claim 11, wherein each of the grafts of the graftstent complexes is attached at one end to a respective one of the first stents, each of the graftstent complexes further including a second stent attached at another end of the graft.

15. A method as in claim 14, including the further step of deploying the second stents within each branch of one of the patient's iliac and femoral arterial system on another side of the aneurysm.

16. A method as in claim 15, wherein each of the graftstent complexes is mounted on a deployment catheter, and including the further steps of:

withdrawing each of the deployment catheters to a position free of the second stents;

partially deploying the deployment catheters to form support surfaces for positioning the second stents;

advancing the second stents by advancing the support surfaces until the second stents have been located in a predetermined location; and

maintaining the location until each of the second stents is deployed.

17. A method as in claim 16, wherein the predetermined location is above an internal iliac artery so that neither of the deployed stents bypasses the patient's internal iliac artery.

18. An apparatus for rotationally aligning a pair of indwelling stents to be collaterally deployed, comprising:

means for rotatably supporting each of a pair of deployment catheters, each of the deployment catheters having a shaft which includes a proximal portion and an other

portion, each of the pairs of indwelling stents being supported on the other portion of a respective one of the shafts; and

indicating means on the proximal portion of each of the shafts for indicating the relative rotational orientation of the pair of indwelling stents, so that rotation of the proximal portion of the shafts, which extends external to a patient, provides a corresponding rotation of the other portion of the shafts, whereby the relative rotational orientation of the supported pair of indwelling stents is indicated by the proximal indicating means.

19. An apparatus as in claim 18, wherein the proximal indicating means comprises at least one marker on the proximal end of each of the shafts.

20. An apparatus at a predetermined location on a catheter that radially expands a stent to a non-circular configuration, comprising:

a member being movably mounted with respect to the catheter;

a deployment wire having a distal end connected to the member for axially moving the member with respect to the catheter;

a plurality of first arms of a first length;

a plurality of second arms of a second length, the first length being greater than the second length;

a plurality of links;

a plurality of wings partially surrounding the member to form a support surface for the stent, at least two of the wings being pivotally connected to the member by the links; and

a rigid portion axially mounted on the catheter, each of the wings being pivotally connected to the rigid portion by one of the first and second arms so that the wings connected to the first arms displace radially outwardly more than the wings connected to the second arms when the member is moved axially by the deployment wire in a first direction.

21. An apparatus as in claim 20, further comprising initiating means movably mounted with respect to the catheter for initiating displacement of the wings.

22. An apparatus as in claim 21, further comprising an initiating wire fixedly connected to the initiating means for axially moving the initiating means with respect to the catheter.

23. An apparatus as in claim 22, further comprising an actuator coupled to the initiating wire such that movement of the actuator causes the initiating means to move axially in the first direction.

24. An apparatus as in claim 22, wherein each of the first and second arms has a distal portion free of contact of the initiating means and a proximal portion that engages the

initiating means when the initiating means is moved axially in the first direction by the initiating wire.

25. An apparatus as in claim 24, wherein the proximal portion of each of the first and second arms has a sloped edge so that the initiating means gradually engages the first and second arms as it is moved axially in the first direction by the initiating wire.

26. An apparatus as in claim 25, wherein the sloped edge is 15°.

27. An apparatus as in claim 20, further comprising a trigger mechanism, the catheter being rotatably mounted at its proximal end to the trigger mechanism, the trigger mechanism being coupled to a proximal end of the deployment wire so that movement of the trigger mechanism causes the member to move axially relative to the catheter.

28. An apparatus as in claim 20, wherein the deployment wire is terminated at a proximal end with a slotted member.

29. An apparatus as in claim 28, further comprising a trigger mechanism, the trigger mechanism engaging the slotted member such that movement of the trigger mechanism causes the member to move axially with respect to the catheter.

30. In combination with an expandable prosthesis, an apparatus for deploying the expandable prosthesis with a non-circular cross-section at a site within a body lumen, comprising:

a support for supporting the expandable prosthesis while being delivered to the site within the body lumen; and

a radially displaceable mechanical linkage connected to the support for radially displacing the support, the linkage including means for expanding the expandable prosthesis to a non-circular cross-section when the linkage is displaced radially outward, the means being adapted to deploy the expandable prosthesis when displaced radially outward, the linkage permitting continuous fluid flow within the body lumen while the expandable prosthesis is being deployed.

31. An apparatus at a predetermined location on a catheter for collaterally deploying a pair of stents within a common body lumen, which comprises for each stent to be deployed a deployment head comprising:

a member being movably mounted with respect to the catheter;

a deployment wire having a distal end connected to the member for axially moving the member with respect to the catheter;

a plurality of first arms of a first length;

a plurality of second arms of a second length, the first length being greater than the second length;

a plurality of links;

a plurality of wings partially surrounding the member to form a support surface for the stent, at least two of the wings being pivotally connected to the member by the links; and

a rigid portion axially mounted on the catheter, each of the wings being pivotally connected to the rigid portion by one of the first and second arms so that the wings connected to the first arms to displace radially outwardly more than the wings connected to the second arms when the member is moved axially by the deployment wire in a first direction.

32. An expanded vascular stent, the expanded vascular stent having a non-circular cross-section.

33. An expanded vascular stent as in claim 32, wherein the expanded vascular stent self-expands to the non-circular cross-section.

34. An expanded vascular stent as in claim 32, wherein the non-circular cross-section is a generally "D" shaped configuration.

35. An expanded vascular stent as in claim 34, wherein the generally "D" shaped configuration has a curved edge and an alignment edge, the curved edge being adapted to engage a body lumen and the alignment edge being adapted to engage a collaterally expanded vascular stent.

36. An expanded vascular stent as in claim 35, wherein the expanded vascular stent has a proximal and a distal end, the expanded vascular stent further comprising a segment of graft material having at least one end cut on a bias, the at least one end being attached to the expanded vascular stent such that the graft material extends substantially between the proximal and distal ends along the alignment edge, yet only partially along the curved edge.

37. A graftstent complex for hemostatically bypassing an aneurysm, comprising:

a segment of graft material;

a balloon-expandable stent; and

a self-expanding stent,

the segment of graft material being attached at one end to the balloon-expandable stent and at another end to the self-expanding stent.

38. A graftstent complex, comprising:

a segment of graft material having at least one end cut on a bias; and

a tubular stent having a proximal end, a distal end, and a lumen therebetween, the stent being attached to the at least one end of the graft material so that the graft material extends substantially between the proximal and distal ends along one margin of the stent, yet only partially along another margin of the stent because of the biasness of the graft material.

39. A graftstent complex as in claim 38, wherein the segment of graft material has another end, the graftstent complex further comprising a second tubular stent attached to the another end.

40. A method for endoluminally isolating a pathological defect in the vicinity of branched passageways, comprising the steps of:

advancing first and second graftstent complexes from a common passageway into separate branches of the branched passageways, the common passageway being in direct fluid communication with the branched passageways, each of the graftstent complexes comprising a first stent, a graft, and a second stent;

deploying the first stents of each of the first and second graftstent complexes in separate branches of the branched passageways on one side of the pathological defect;

aligning the second stents relative to each other in the common passageway on another side of the pathological defect,

deploying the aligned second stents in the common passageway, whereby fluid flows in the passageway through each of the graftstent complexes thereby isolating the pathological defect.

41. A method as in claim 40, including the additional step of positioning the first stents in separate branches of the branched passageway before the step of deploying the first stents.

42. A method as in claim 41, wherein the step of positioning includes the steps of:

partially expanding a stent deployment means in each of the branched passageways to a diameter greater than or equal to a diameter of the non-deployed first stents and at a position proximal to the first stents ; and

advancing the partially expanded deployment heads to a different position so as to urge a proximal margin of the first stents and advance the first stents into position.

43. A method as in claim 40, wherein the first stents are of the self expanding variety, and the step of deploying the first stents includes the step of withdrawing a surrounding sheath to a position proximal to the first stents thereby exposing the first stents to the branched passageways and permitting self-expansion.

44. A method as in claim 40, including the additional step of coaxially positioning a stent deployment means within the second stents before the step of aligning the second stents in the common passageway.

45. A method as in claim 44, wherein the step of coaxially positioning the second stents is performed under fluoroscopic control.

46. A method as in claim 40, wherein the step of aligning the second stents includes the step of rotationally aligning a portion of each of the second stents relative to one another.

47. A method as in claim 40, wherein the step of deploying includes the step of mechanically expanding the aligned second stents.